

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-199419

(43)Date of publication of application : 31.07.1997

(51)Int.Cl.

H01L 21/20

C30B 29/38

H01L 33/00

H01S 3/18

(21)Application number : 08-007340

(71)Applicant : NEC CORP

(22)Date of filing : 19.01.1996

(72)Inventor : NIDOU MASAOKI

KIMURA AKITAKA

SUNAKAWA HARUO

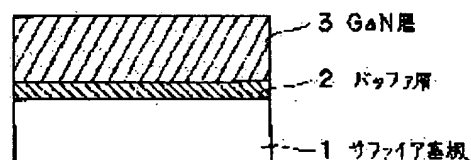
YAMAGUCHI ATSUSHI

## (54) CRYSTAL GROWTH METHOD OF GALLIUM NITRIDE COMPOUND SEMICONDUCTOR AND MANUFACTURE OF SEMICONDUCTOR LASER

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve the flatness and the orientational property of crystallization, and to decrease the defect of lamination by a method wherein the surface of a crystal substrate is formed in such a manner that the tilt angle of the plane direction, which is equivalent to specific plane direction, is set within a prescribed value.

**SOLUTION:** A GaN buffer layer 2 is crystal-grown on a sapphire substrate 1 having (1, -1, 0, 1) faces as the surface, and a GaN layer 3 is crystal-grown thereon. The crystal growth speed in the direction vertical to the (1, -1, 0, 1) faces is slow, and the atomic migration on the above-mentioned plane is intensified. As a result, a hexagonal gallium nitride compound semiconductor, which is smooth on the surface in the direction in parallel with the substrate surface and having uniform C-axis orientational direction, is formed. The same effect can be obtained even when the orientation of substrate is inclined by 5 degrees or less from the (1, -1, 0, 1) face orientation.



### LEGAL STATUS

[Date of request for examination]

19.01.1996

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 2830814  
[Date of registration] 25.09.1998  
[Number of appeal against examiner's decision  
of rejection]  
[Date of requesting appeal against examiner's  
decision of rejection]  
[Date of extinction of right]

Copyright (C); 1998,2000 Japan Patent Office